

Suggested Functions and Elements of a Regional Operations Center for a IOOS Regional Association

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General Functions of a Regional Operations Center (ROC)

The primary function of the GCOOS ROC is to monitor and report the availability of all near real-time data streams and regularly-produced products offered by provider members of the GCOOS-RA.

The ROC will be staffed twenty four hours a day, seven days a week (24/7) and act as a central point of information, contact, and feedback for users and providers on all issues related to the current availability, inventory, and status of the region's data and product generating elements.

The centralized monitoring function of the ROC will ensure that each provider's implementation of the DMAC Plan's system architecture and best practices meets the interoperability requirements of IOOS. In this regard the ROC can act as a test bed for new and established contributors to test their delivery systems for conformance with DMAC requirements.

The ROC, in concert with the GCOOS-RA DMAC Coordinator, will foster usage and interoperability by making technology transfers to providers and users with limited Information Technology (IT) resources, and by striving to harmonize the ways in which all providers offer their data and products.

The ROC will generate metrics on both the availability of and access to data and products and will compile feedback regarding levels of satisfaction and experiences derived from users and providers. These metrics will be used to gauge the effectiveness of the system and to generate reports.

In the course of serving its primary function, the ROC will be involved in various aspects of quality-control/assurance (QA/QC) as well as generation and use of detailed metadata. It will offer useful services to both users and providers.

The ROC will attempt to harmonize access to data and products and will maintain a comprehensive set of web links to data and products, hence it should become a popular access point to data and products. While this is valuable to the consumer it also has the potential to obscure the sources. Most providers require a certain amount of visibility to satisfy their sponsors and promote continued funding. With that requirement in mind, any public web pages hosted by the ROC will emphasize and credit the organization providing the data or products.

Detailed Functions of a ROC

The suggested functions and services of the ROC are expanded in the sections to follow.

Monitoring. The ROC will monitor the availability of near real-time data streams and those products, which are produced regularly (e.g. nowcast/forecast model output). The center can make provisions to monitor and report on time series from shorter duration measuring programs such as AUV deployments or cruises that telemeter data to shore.

The ROC will acquire or assemble and make available a complete inventory of all measurements offered by observing system elements. It will catalog informational metadata for each sensor such as: sensor type, make, model, id, accuracy, calibration history, location in space, associated platform, associated program, originating organization, sponsors, points of contact, and links to additional sources of information. Temporal sampling schemes for each sensor also will be made available, including sampling rate as well as frequency of transmission of the data set. This catalog will be public and updated as needed.

The ROC will scan the data channels associated with each sensor and product on a continuous (24/7) basis and report their availability through publicly available web pages and catalogs. The scan rate will be appropriately matched for each channel monitored. If the data or products unexpectedly become unavailable, or change character in a manner suggesting the data quality is not good, then the provider will be notified immediately and the data channel marked suspect. The status of the problem and its resolution will be posted on a public ROC website. The scan rate and method of contact will be determined through direct contact with each registered provider.

Metrics. Data availability will be logged during the scanning process and the logs processed to quantify the percentage and amounts of time that data are available. The reasons why data were unavailable will be categorized so that weak points in the system can be clearly identified leading to solutions that improve the long-term reliability of the system. The frequency of public access through the ROC web links also will be quantified through web site access logs. Accesses made directly through the provider's web sites and the amount of data downloaded cannot be tracked by the ROC. Depending on the nature and character of what is being measured, metric gathering software often needs to be installed on the host data server itself. The ROC can participate in producing and deploying such software so that metrics are gathered in a uniform and comparable way subject to the providers' concurrence. To the extent possible, metrics being developed for WMO-IOC Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM) will be used.

Quality assurance and quality control. The ROC will develop and implement near real-time quality control and quality assurance (QA/QC) checks in order to recognize bad or suspect data. The data will be monitored for values that exceed historical or reasonable ranges, rate-of-change thresholds, or unrealistic changes in variability such as occur when

sensors foul or fail. The ROC will not be responsible for comprehensive delayed mode QA/QC processing.

Agreed to plans for instrument calibration and validation and for servicing of in situ instrumentation will be provided to and maintained by the ROC. The center will contact operators of observing system elements to help ensure that such plans are developed and submitted. In cases when calibration/validation or servicing are not being performed on schedule, the ROC will note that when providing instrument status information.

Services to providers. Services can be provided by the ROC to operators of observing system elements.

The ROC will be a resource for the regional participants, especially those with limited IT resources. The ROC can provide guidance and platform-specific advice on proven software technologies and implementation methods that will quickly bring providers online with DMAC-compliant methods. The ROC, in coordination with the GCOOS-RA DMAC Coordinator, can provide information regarding "best practices" and limited software support in the areas covered by the DMAC plan, such as access, discovery, catalog, metadata, transport, online browse, and archive. Information on best practices and standard indicators for QA/QC as well as semantic (use) metadata developed by the community, especially the QARTOD activities, will also be available through the ROC and regional DMAC Coordinator.

Operators of observing system elements usually have limited staff and often do not immediately realize when instruments, computers, or telecommunications circuits go down. The ROC will notify the data provider in the event that data or products cease to be available or become suspect. In cooperation with the operators, the ROC can devise a notification procedure using appropriate delays and communications mechanisms.

The ROC will maintain records, based on the GCOOS Observing Plan, of procedures for instrument calibration/validation and routine servicing and will notify operators of subsystems when such work is required.

The ROC can help providers produce detailed metadata that meets national requirements and facilitates interoperability. The ROC will maintain this information and update it as needed and make it available to requestors. The ROC can check to see that these metadata support interoperability and have found their way to the appropriate catalogs.

The ROC will function as a test-bed to ensure that the regional members are serving their data and products in a DMAC-compliant way. When DMAC certification criteria are developed, the ROC can act as a testing and verification group.

Metadata. The ROC will acquire (collect or co-produce) detailed harmonized machine-readable metadata for the region's data and products to support machine-to-machine interoperable data discovery, data catalog, and data access. The ROC will have the

experience to put these data in FDGC-compliant format and thereby relieve the observing system operators of this onerous task.

The DMAC compliance plans will include descriptions of how data and metadata will be transmitted to the data assembly and quality control centers and to archive centers (both regional and national). The ROC can guide the operators in producing this information by suggesting software tools that ease this work, or solicit the information from them and format appropriately.

Services to users. The ROC will provide a focus for data and product access, user feedback, and problem resolution. The ROC can be contacted through phone, email, or instant messenger programs. Bulletin boards, web pages, and RSS subscription services will keep interested users abreast of activities and plans at the center and of the member providers.

Feedback from users on desired system enhancements will be provided to the GCOOS Office, which will forward the information to the appropriate GCOOS Committee(s) for their consideration and use in making recommendations to the Board. Complaints will trigger immediate transfer of information to system element operators. The information transferred in these exchanges will become part of the system's performance metrics.

This will provide a procedure for obtaining and responding to user feedback concerning timely delivery, quality, and usefulness of products. The Office will maintain a record of complaints, remedying actions, and their success/failures. A record of success stories and of endorsements of GCOOS by users will be maintained by the GCOOS Office. This information will be shared with other IOOS Regional Associations via the NFRA.

The ROC will coordinate response to events requiring special vigilance or actions (e.g., hurricanes, harmful algal bloom occurrences, or oil spills). It also will coordinate data flow to operational modeling efforts.

Reporting

The GCOOS ROC will report to the Board of Directors through the GCOOS Regional Office.

